is required to make them valuable as illustrations of disease of the fundus of the eye.

Believing, as we do, in the value of medical ophthalmoscopy, we are convinced that such a work as this is better calculated to bring it into disrepute than to advance it. O. F. W.

ART. XXII.—*On the Relation between Diabetes and Food, and its Application to the Treatment of the Disease.* By ARTHUR SCOTT DONKIN, M.D. Edin., M.D. Durham; formerly Physician to the Sunderland Infirmary and Dispensary, etc. 16mo. pp. 186. New York: G. P. Putnam's Sons, 1875.

THE writer of this little book will be remembered as the author of a work upon the skim-milk treatment of diabetes. In that publication, and in many papers in the medical journals of the last five years, he has presented several scores of cases treated in the manner indicated. Further observation and experience have confirmed his belief in the efficacy of the treatment, and wrought no very essential change in his views as to the nature of the disease.

In his first chapter, Dr. Donkin makes a vigorous attack on the views of Bernard and of Dr. Pavy, whose ideas, though not precisely identical, both imply that the disease is due to an intensification of a natural process—the formation of glycogen in the liver. The *a priori* improbability that the vastly increased secretion of a natural and useful substance, designed to nourish and to support vital heat, should at the same time be wholly and morbidly converted into a substance which the system cannot use, is forcibly shown. The writer declines, moreover, to infer that, because artificial irritation of a certain tract of nerve-matter causes a temporary appearance of sugar in the urine, therefore a chronic, progressive, and fatal disease, characterized by the persistence of saccharine urine, must be attributed to disease of the same nervous centre. Indeed, he shows us that Bernard himself has in effect admitted that his assumptions were not well founded. That such engorgement of the liver, as is implied by the theory of central nervous influence acting upon the vessels of that organ, could exist for months and leave no trace behind, seems to him incredible. Yet the liver, after death from diabetes, presents no evidence of changes such as would be expected from prolonged vasomotor paralysis. As for direct testimony to the discovery of lesions in the nervous system itself, as offered by Dr. Dickinson, the writer shows, we think, that there is entire failure to establish even a reasonable probability that the changes are causative rather than consequent. On the contrary, such degenerative processes as are described would be most likely to follow the mal-nutrition from a blood not merely loaded with sugar, but every way impoverished by a disease which is, practically, slow starvation. No autopsy, as yet, has shown the nerve-lesions in an early stage of the disease.

The idea that the disease is caused merely by the non-combustion of sugar normally formed is disproved by the fact that in many cases the excretion reaches an amount largely beyond that contained in, or derivable from, food naturally assimilated. Thus, a child weighing thirty-seven pounds excreted sixty-three pounds of sugar in one hundred and three days, and in one day twenty ounces.

No writer upon diabetes has failed to notice the influence of diet. How this could so immediately affect the excretion if the disease is a neurosis, is difficult to explain.

Knowing that the secretion of glycogen is one of the functions of the liver, and that this substance is capable of transformation under certain conditions into diabetic sugar, and that a certain diet will almost or quite prevent the morbid excretion, Dr. Donkin deems it only reasonable to attribute diabetes to morbid nutrition and morbid secretion in that organ. In this condition he believes the cells secrete no longer glycogen but sugar. And no matter what the food may be, the sugar is always of that particular kind. The morbid matter being easily soluble does not remain and form a diseased growth, but is taken into the bloodvessels by osmotic action, and expelled through the kidneys.

In his second chapter Dr. Donkin presents an admirable picture of the disease and its phenomena, especially in its earlier stages. The first step in the series of morbid acts whereby the liver seems to pervert the food from its nutritive functions occurs in the transformation only of saccharine and starchy food into diabetic sugar or glucose. Probably only a portion, even of this, is at first misused. It is only in the later stages that the morbid changes extend to fatty and to nitrogenous food.

As substances designed to support animal heat, and to nourish muscles and other organs, are diverted from their proper uses, malaise, failure of strength and loss of weight appear. These may at first be counterbalanced by larger supplies of food, which the usually good appetite and strong digestion enable the patient to consume. As the blood becomes loaded with sugar, an endosmotic action occurs, by which the tissues are drained of the thinner fluid which everywhere pervades them. This causes thirst, suppression of perspiration, both sensible and insensible; while it distends the vascular system and causes an excessive outpouring through the kidneys. The greater the sugar formation, the more marked become the parched mouth, the dry skin, the constipation, and the urinary flux. And, as would be expected, all the symptoms vary in intensity with the character of the food taken, as more or less convertible into sugar.

We have just referred to the endosmosis believed to occur between tissues and veins. A little reflection will indicate that Prof. Vogel and Dr. Donkin are probably correct in assuming that at times the current is the other way, giving us, as to the bloodvessels, exosmosis. For the diffused fluids, also, become saccharine and therefore dense. And so, if by the drinking of a large amount of water, the blood is temporarily made thinner and the vessels distended, the tissues would attract enough to restore equality. The kidneys then again perform their function, and there thus occurs a perpetual alternation in the transfusion of fluids between vessels and tissues. This explains the comparative slowness with which, in this disease, drinking is followed by diuresis.

There is no reason to believe that diabetic sugar is ever formed from any tissue of the body. That it might for a considerable time continue to appear during fasting, is not strange when we remember the saturation that obtains.

Dr. Donkin next passes to the more particular inquiry as to what classes of aliments are subject, or most subject, to this morbid transformation. As before stated, in mild cases, or probably in the earlier stage of all cases, only vegetable sugars and starches undergo the change. Or, at all events, the excretion does not appear in the urine when such foods are, and have been for days, strictly banished from the diet. In several cases, carefully observed by distinguished men, the amount of sugar in the urine was very exactly measured by, or proportioned to, the amount of these elements ingested. The writer believes that many if not all of the cures of diabetes, by restricted but mixed diet, have been in cases which had not passed beyond this first stage. Oftentimes, he says, this stage is very protracted, lasting, as Prout testifies, for years. The very great importance of recognizing diabetes in this its curable period, is too obvious to need more than the suggestion.

If unfortunately the disease is not recognized, there comes a time when not sugar and starch only, but albuminous and oleaginous matters begin to undergo this fatal metamorphosis. Now, the heat-making power, heretofore maintained by fats in place of the lost starch and sugar, obtains from the food no adequate pabulum. The nutrition of the muscles and of the entire system is interfered with. Emaciation, from increased destruction and diminished repair, proceeds with startling rapidity. The slight malaise of the first stage gives place to alarming nervous prostration and extreme muscular debility. The moderate thirst and hearty appetite become an unquenchable drought and an insatiable voracity. All the symptoms before noticed become intensified. The urine, voided in enormous volumes, is constantly loaded with sugar. The vital heat and the physical strength fail rapidly, and death from inanition soon ensues, *unless this fatal transformation can be arrested.*

As the patient is dying for want of nourishment, the problem is to administer a food which, resisting the morbid activity of the liver, shall make healthy blood. This food Dr. Donkin has discovered, in milk deprived of its oleaginous elements. We need not follow him in his clinical demonstrations of the reality of his discovery. It is enough to say that he here presents several new cases, mostly drawn from the experience of other physicians, showing that recovery even in advanced cases occurs when the skim-milk diet is rigidly followed.

Two or three vigorous and logical chapters are devoted to the demonstration of the facts, that fats and albuminous matters are mis-assimilated in advanced diabetic cases, and that the lactose and casein of the skim-milk do not suffer such perversion. These chapters seem to us wholly conclusive. In instance after instance, when sugar had disappeared under the chosen diet, it reäppeared at once upon the ingestion of cream or meat; and as invariably again disappeared when the skim-milk formed the sole diet. In these chapters he smites his revilers and cavillers hip and thigh; showing clearly enough that no hostile champion has as yet found a crevice in his armour. Certainly no gentleman has a right to cry out that his treatment was a failure, when the essentials of that treatment were openly violated, or precautions against their violation neglected. Personal experience has shown Dr. Donkin that patients, especially in hospitals, will resort to deceit, and risk their own lives as well as the physician's reputation, in order to gratify the palate, or from belief in their own superior knowledge as to proper diet.

The nutritive principles of the skim-milk are casein and lactose. The former, or nitrogenous element, while not absolutely and in all cases in-capable of conversion into sugar, is much less prone to such change than any other albuminous aliment. Lactose is not in the slightest degree subject to diabetic perversion. Those who, with Dr. Davy, assume that it must be injurious in diabetes, because it is itself a form of sugar, ignore its well-known and special characters. Its chemical properties and physiological relations, our author says, are widely different from diabetic sugar and other forms of glucose. It does not undergo alcoholic fermentation, but is subject to the lactic, which it goes through in the stomach in the presence of casein. That these elements really are assimilated, is indubitably proved by improved health and strength, and the disappearance of diabetic sugar, under their sole dietetic use. To call a diet containing such principles, aside from its proved efficiency, a "starvation diet," is a sneer which will injure its utterers much more than it will Dr. Donkin

The fifth and last chapter gives careful directions for treatment. Recognizing the grave facts, that the disease has no natural tendency to recovery, and that drugs are practically useless except in treating complications, Dr. Donkin believes the only known means of arresting and curing diabetes is the strict enforcement of the diet associated with his name. He begins with four to six pints of carefully skimmed milk for the first day, which may be increased, according to circumstances, up to eight or even twelve. The latter point should not be exceeded, and if reached, one-third of the amount should be made into curds with essence of rennet. The milk is generally relished by the patient, and may be warmed if preferred, but never boiled. Relief to distressing symptoms, and increase of strength, appear almost at once. When the action is curative, the sugar disappears in from two to six weeks. When the disease has progressed too far for cure, great improvement often occurs. In a few advanced cases there is complete failure. If *no diminution* of sugar follows a week of strict treatment, no good will result.

After complete disappearance of sugar for from two to six weeks, cautious advances may be begun towards a mixed diet. For the precise steps of this progress we must refer our readers to the work itself, noting only an avoidance of fatty, starchy, and saccharine foods. Even after months or years of apparent health, bread and other starchy food should be avoided. The lactose of milk—not now necessarily skimmed—will supply the want of these. A bread made of gluten and bran, has been invented by the author to satisfy the craving for some solid of that character.

B. L. R.

ART. XXIII.—*Naval Medical Schools of France and England.* Reported to the Bureau of Medicine and Surgery. By R. C. DEAN, Medical Inspector U. S. Navy. 8vo. pp. 94, and 9 plates. Washington: Government Printing Office, 1876.

WHATEVER may be our opinion as to the value of the more commonly known "Public Documents," Americans may point to the scientific publications of the government with unalloyed pride. In the form of "Reports" of various kinds, these are constantly assuming greater im-